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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,847	10/20/2003	Robert A. August	NC 84,355	7110

26384 7590 07/28/2006

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EXAMINER

MALEVIC, DJURA

ART UNIT PAPER NUMBER

2884

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/693,847	AUGUST ET AL.	
	Examiner	Art Unit	
	Djura Malevic	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-30 is/are allowed.
- 6) ☒ Claim(s) 1-8, 31-38, 41-48 and 51-58 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 39, 40, 49, 50, 59 and 60 is/are objected to:
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The declaration faxed on 7/14/2006 under 37 CFR 1.131 is sufficient to overcome the Kurkoski et al. reference.

Claim Objections

Claims 32 –34 and 42 –44 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. With regards to claims 32 –34 and 42 –44, the limitation that recites, including “an insulating or barrier layer in-between the neutron conversion layer and the active semiconductor layer” would render the claims inconsistent and not limiting. In fact, such a layer would even be conflicting with previous claims, which recites “a neutron conversion layer adjacent to the active semiconductor or a neutron conversion layer in contact with the active semiconductor layer”, since a layer in-between the neutron conversion layer and the active semiconductor layer would exist, the said conversion layer would not be in contact or adjacent to said active layer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5-8, 31, 32, 25-38, 41, 41, 45-48, 51, 52, 55-58 are rejected under 35 U.S.C. 102(b) as being anticipated by Hossain et al. (US Patent 6,075,261).

With regards to claims 1, 31, 41, and 51, Hossain discloses a neutron detection device (Fig 1a –1e) comprising an active semiconductor layer including a plurality of charge-sensitive cells 103; and a neutron conversion layer 121 located adjacent, in contact or in close proximity to said cells which is located within a distance from the said active semiconductor no greater than the range of neutron reactant product particles traversing the distance. Note, Hossain discloses that the insulating layer 119 is optional, thus disclosing the said conversion layer 121 adjacent and in contact with said active semiconductor layer (Col. 2; Line 59 – Line 61).

With regards to claims 2, 32, 42, and 52, Hossain discloses an insulating layer 119 between the active semiconductor layer and the neutron conversion layer (Col. 2; Line 60) (Claim 23).

With regards to claims 5, 8, 35, 38, 45, 48, 55, and 58, Hossain discloses that suitable neutron-reactive elements include Boron and Lithium (Col. 3, Line 2).

With regards to claims 6, 36, 46, and 56, Hossain discloses that the conversion layer comprises Borophosphosilicate glass (BPSG) (Col. 3, Line 9 – Line 11).

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With regards to claims 7, 37, 47, and 57, Hossain discloses Borophosphosilicate glass (BPSG) (Col. 3, Line 9), which comprises 5 percent boron.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 33, 34, 43, 44, 53, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossain in view of Brandl et al. (US Pub. 2005/0067695 A1).

With regards to claims 3, 4, 23, 24, 33, 34, 43, 44, 53, and 54, Hossain discloses the invention according to claim 1, but does not expressly disclose a barrier layer located between the neutron conversion layer and the active semiconductor layer. Brandl discloses that a barrier layer is formed between the integrated circuit and the metal layer (between the neutron conversion layer and the active semiconductor layer), which prevents diffusion of atoms from the metal layer (lithium) into the integrated circuit (semiconductor layer) [0019]. Brandl also discloses that the barrier layer may be made of silicon nitride, which limits dispersion of atoms of the metal layer into the sensor element [0045]. Hossain and Brandl are analogous art because they both work on semiconductor sensors.

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It would have been obvious at the time the invention was made to modify Hossain to include a barrier layer such as that taught by Brandl in order to prevent diffusion of atoms from the metal layer (lithium) into the integrated circuit (semiconductor layer) [0019].

Allowable Subject Matter

Claims 11-30 are allowed.

Claims 9, 10, 39, 40, 49, 50, 59 and 60 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

With regards to claims 9, 39, 49 and 59, the prior art of record does not suggest or teach a method to provide multiple neutron conversion layers, in combination with the rest of the claim limitations.

With regards to claims 11 and 16, the prior art of record does not suggest or teach a method of manufacturing a neutron detector from a memory device, wherein the steps comprise: removing the base substrate layer from a memory device to expose the insulating layer and forming a neutron conversion layer on the insulating layer, in combination with the rest of the claim limitations.

Although, references like Hossain discloses a method of forming a neutron-reactant material over one or more memory cells. Hossain shows no concern nor suggests any modifications for removing the base substrate layer from a memory

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device to expose the insulating layer and forming a neutron conversion layer on the insulating layer.

With regards to claim 21, the prior art of record does not suggest or render obvious an active semiconductor layer including a plurality of charge-sensitive cells wherein a neutron conversion layer is located under said active semiconductor layer.

Claims 10, 12 –15, 17 –20, 22 –30, 40 and 60 are allowed because they further limit claims 9, 11, 16, 21, 39, 49 and 59, respectively.

Response to Arguments

Applicant's arguments have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., proximity distance of the neutron conversion layer to the cells; thickness of the neutron reactant material; and the thickness of the circuit structure layers) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to

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do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Hossain and Brandl are analogous art because they both work on semiconductor sensors. It would have been obvious at the time the invention was made to modify Hossain to include a barrier layer such as that taught by Brandl in order to prevent diffusion of atoms from the metal layer (lithium) into the integrated circuit (semiconductor layer) [0019].

In response to applicant's argument that Hossain discloses boron prepared BPSG with concentrations of boron no more than 8 percent at best and thus the great majority of the material in BPSG is merely another intervening attenuating material, the examiner agrees. However, claims 7, 37, 47 and 57 as recited claims "boron-containing glass includes 5% boron", which the BPSG glass consist of and applicant remarks imply.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hossain et al. (US Patent 5,913,131) teaches that BPSG contains boron concentrations of five percent and any concentration higher would make the glass unstable.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37.CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is

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filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is (571) 272-5975. The examiner can normally be reached on Monday – Friday between 8:30am –4:00pm.

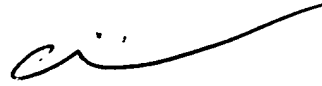
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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